

TRANSMISSION APPARATUS FOR HOLDING A LOCK CORE OF A SUPPLEMENTAL LOCK

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to a transmission apparatus that holds a lock core of a lock, and more particularly to a transmission apparatus that aids precise installation of a lock core in an supplemental lock.

2. Description of Related Art

Generally, normal house and room doors need more than one lock to provide high security. Door locks are available in a variety types and structures for different applications. Trumpet locks, lever locks, doorknob locks and supplemental locks are commonly used to lock doors.

Trumpet locks, lever locks and doorknob locks are the primary locks used to lock doors. Supplemental locks provide security for doors in addition to the primary locks where the primary locks are part respectively of the doors or the doorknobs.

With reference to Figs. 10 and 11, a conventional apparatus to hold a lock core (not shown) of a supplemental lock comprises a housing (50), an outer disk (52), a latch bolt coupler (53) and an inner disk (54).

The housing (50) has a front (not numbered), a rear (not numbered), a lock core chamber (51), a front opening (511) and a rear opening (512). The lock core chamber (51) holds a lock core (not shown). The front opening (511) is defined in the front and communicates with the lock core chamber (51) and through which a lock core is mounted in the lock core chamber (51). The rear

1 opening (512) is defined in the rear and communicates with the lock core
2 chamber (51).

3 The inner disk (54) is rotatably mounted in the lock core chamber (51),
4 is rotated by the lock core and comprises a rotatable base (541) and two lock
5 coupling arms (542). The base (541) has a central through hole (543). The central
6 through hole (543) is defined completely through the base (541) and has a
7 keyway (544). The lock coupling arms (542) protrude longitudinally from the
8 base (541) toward the front opening (511), are parallel to each other, connect to
9 the lock core and are rotated by the lock core.

10 The outer disk (52) is rotatably mounted on the rear of the housing (50),
11 covers the rear opening (512) and has a disk (520) and a protrusion (521). The
12 disk (520) covers the rear opening (512) and has a rectangular through hole (522).
13 The protrusion (521) extends from the disk (520) and is rotatably held in the rear
14 opening (512). The rectangular through hole (522) is defined completely through
15 the disk (520) and is aligned with the central through hole (543) in the base
16 (541).

17 The latch bolt coupler (53) comprises a rectangular driving rod (531), an
18 enlarged head (532) and a key (533). The rectangular driving rod (531) has an
19 inside end (534) and an outside end (535). The enlarged head (532) and the key
20 (533) are formed at the inside end (534), and the key (533) is aligned with and
21 engages the keyway (544) in the base (541). The outside end (535) extends into
22 the central through hole (543) in the base (541) and the rectangular through hole
23 (522) in the disk (520) and extends out of the rectangular through hole (522) to
24 connect to a latch bolt (not shown) to drive the latch bolt. The enlarged head (532)

1 abuts the base (541) of the inner disk (54). The inner disk (54) will rotate the
2 latch bolt coupler (53) that drives the latch bolt when the lock core rotates the
3 inner disk (54).

4 However, assembling the conventional transmission apparatus that holds
5 the lock core is inconvenient. First, the outer disk (52) must be mounted on the
6 rear of the housing (50) with the protrusion (521) rotatably held in the rear
7 opening (512). Then the inner disk (54) and the latch bolt coupler (53) can be
8 mounted in the lock core chamber (51), and the outside end (535) of the driving
9 rod (531) extends into the central through hole (543) in the base (541) and the
10 rectangular through hole (522) in the disk (520) and extends out of the
11 rectangular through hole (522) to connect to the latch bolt. Then the lock core is
12 mounted in the lock core chamber (51) and connected to the lock coupling arms
13 (542) to drive the latch bolt coupler (53) through the inner disk (54).

14 Since the outer disk (52), the latch bolt coupler (53) and the inner disk
15 (54) are individually attached to the housing (50), the three elements do not
16 mutually hold each other in position during the assembly of the apparatus. The
17 outer disk (52), the latch bolt coupler (53) and the inner disk (54) cannot be
18 efficiently held in position in the housing (50) before the lock core is mounted in
19 the lock core chamber (51). This adversely influences the assembly and quality
20 of the supplemental lock.

21 To overcome the shortcomings, the present invention provides an
22 improved transmission apparatus that holds a lock core of a supplemental lock to
23 mitigate or obviate the aforementioned problems.

24 SUMMARY OF THE INVENTION

1 The main objective of the invention is to provide a transmission
2 apparatus to hold a lock core of a supplemental lock, which makes assembly of
3 the entire transmission apparatus and installation of the lock core convenient.

4 The transmission apparatus to hold a lock core of a supplemental lock in
5 accordance with the present invention includes an inner housing, an inner disk, a
6 lock coupler, a latch bolt drive, a restitution element and a cover. The inner
7 housing has a lock core chamber defined completely through the inner housing
8 to hold the lock core. The lock core chamber has an inner shoulder. The inner
9 disk rotatably abuts the inner shoulder in the inner housing. The lock coupler is
10 attached to the inner disk and includes a rotatable outer disk coupler and two lock
11 coupling arms. The outer disk coupler has a flat edge. The lock coupling arms
12 extend from the outer disk coupler toward the inner disk and penetrate the inner
13 disk to connect to the lock core. The latch bolt coupler is rotated by the lock
14 coupler and includes a latch coupling arm with an inner end and an outer end,
15 and a longitudinal tab formed at the inner end. The restitution element is
16 mounted around the latch coupling arm of the latch bolt coupler to provide a
17 restitution force to hold the latch bolt coupler in place. The cover is attached to
18 the rear of the inner housing to compress the restitution element. Consequently,
19 the flat edge will abut the longitudinal tab and rotate the latch coupling arm when
20 the outer disk coupler is rotated. The entire transmission apparatus is convenient
21 to assemble.

22 Other objectives, advantages and novel features of the invention will
23 become more apparent from the following detailed description when taken in
24 conjunction with the accompanying drawings.

1 BRIEF DESCRIPTION OF THE DRAWINGS

2 Fig. 1 is an exploded perspective view of a transmission apparatus in
3 accordance with the present invention;

4 Fig. 2 is an operational perspective view in partial section of the
5 transmission apparatus in Fig. 1 mounted in an outer housing of a supplemental
6 lock;

7 Fig. 3 is a rear plan view of the transmission apparatus in Fig. 1;

8 Fig. 4 is a cross sectional plan view of the transmission apparatus along
9 4-4 line in Fig. 3;

10 Fig. 5 is a cross sectional plan view of the transmission apparatus along
11 5-5 line in Fig. 3;

12 Fig. 6 is an operational rear plan view of the transmission apparatus in
13 Fig. 1 when an outer semicircular coupling disk is in its original position;

14 Fig. 7 an operational rear plan view of the transmission apparatus in Fig.
15 6 when the outer semicircular coupling disk is rotated 90 degrees clockwise;

16 Fig. 8 an operational rear plan view of the transmission apparatus in Fig.
17 6 when the outer semicircular coupling disk is rotated 180 degrees clockwise;

18 Fig. 9 an operational rear plan view of the transmission apparatus in Fig.
19 8 when the outer semicircular coupling disk is rotated 180 degrees
20 counterclockwise;

21 Fig. 10 is an exploded perspective view in partial section of a
22 conventional transmission apparatus in accordance with the prior art; and

23 Fig. 11 is a cross sectional plan view of the conventional transmission
24 apparatus in Fig. 10.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

With reference to Figs. 1 and 2, a transmission apparatus to hold a lock core (61) of a supplemental lock in accordance with the present invention is mounted in an outer housing (60) of a supplemental lock. The transmission apparatus comprises an inner housing (10), an inner disk (13), a latch bolt coupler (20), a lock coupler (21), a restitution element (30) and a cover (40).

The inner housing (10) has a front (not numbered), a rear (not numbered) and a lock core chamber (11). The lock core chamber (11) is defined completely through the inner housing (10) and defines respectively a front opening (112) and a rear opening (111) in the front and the rear of the inner housing (10). The lock core chamber (11) has an inner shoulder (113) formed adjacent to the rear opening (111). The rear opening (111) has a figure eight shape that corresponds to the lock core (61). The inner housing (10) further has two threaded mounting holes (12). The threaded mounting holes (12) are diametrically defined in the rear of the inner housing (10).

The inner disk (13) is rotatably mounted in the lock core chamber (11), abuts the inner shoulder (113) in the inner housing (10) and has an elongated central through hole (131).

With further reference to Figs. 4 and 5, the lock coupler (21) is attached to the inner disk (13) and comprises a rotatable outer disk coupler (211) and two lock coupling arms (212). The outer disk coupler (211) is attached to the inner disk (13) and has an outer semicircular coupling disk (213) and a radial extension (214). The outer semicircular coupling disk (213) has a flat edge (215). The radial extension (214) protrudes from the flat edge (215) of the outer

1 semicircular coupling disk (213). The lock coupling arms (212) are attached to
2 the outer disk coupler (211) alongside the radial extension (214) over the flat
3 edge (215), extend toward the inner disk (13) and pass through the elongated
4 though hole (131) in the inner disk (13). The lock coupling arms (212) extend
5 into the lock core chamber (11) and connect to and are rotated by the lock core
6 (61) in the lock core chamber (11).

7 The latch bolt coupler (20) is rotated by the lock coupler (21) and
8 comprises a latch coupling arm (201), an inner semicircular disk (202) and a
9 longitudinal tab (204). The latch coupling arm (201) has an inner end (205) and
10 an outer end (206). The inner semicircular disk (202) is formed integrally with
11 the latch coupling arm (201) at the inner end (205) and abuts on the outer disk
12 coupler (211). The longitudinal tab (204) protrudes from the inner semicircular
13 disk (202) over the radial extension (214) of the outer disk coupler (211) and
14 corresponds to the flat edge (215) of the outer semicircular coupling disk (213).
15 Therefore, the flat edge (215) of the outer semicircular coupling disk (213) will
16 rotate the latch coupling arm (201) when the lock coupler (21) is rotated by the
17 lock core (61) with the flat edge (215) pushing the longitudinal tab (204) of the
18 latch bolt coupler (20). The inner semicircular disk (202) is attached to the outer
19 disk coupler (211) to make the rotations of the entire latch bolt coupler (20) be
20 smooth.

21 The restitution element (30) can be a coil spring and is mounted around
22 the latch coupling arm (201) of the latch bolt coupler (20) to provide a restitution
23 force on the inner semicircular disk (202) so that the inner semicircular disk (202)
24 will firmly abut the outer disk coupler (211).

1 With further reference to Fig. 3, the cover (40) is attached to the rear of
2 the inner housing (10) and has a latch coupling arm hole (41) and two mounting
3 holes (42). The holes (41, 42) are formed completely through the cover (40). The
4 latch coupling arm hole (41) is aligned with the outer end (206) of the latch
5 coupling arm (201) so the outer end (206) of the latch coupling arm (201)
6 extends out of the inner housing (10) through the latch coupling arm hole (41).
7 The extended outer end (206) of the latch coupling arm (201) connects to a latch
8 bolt (not shown) to drive the connected latch bolt that opens or closes the door.
9 The mounting holes (42) are aligned respectively with the threaded mounting
10 holes (12) in the inner housing (10) so that the cover (40) will be fastened on the
11 rear of the inner housing (10) by two fasteners such as bolts (43).

12 With further reference to Figs. 2, 6 and 7, the flat edge (215) on the outer
13 disk coupler (211) abuts the longitudinal tab (204) of the latch bolt coupler (20)
14 when the outer semicircular coupling disk (213) is rotated 90 degrees clockwise.

15 With reference to Fig. 8, further rotation of the outer semicircular
16 coupling disk (213) 90 degrees clockwise will rotate the entire latch bolt coupler
17 (20) including the latch coupling arm (201) 90 degrees so that the latch coupling
18 arm (201) will drive the latch bolt and open the door.

19 With reference to Fig. 9, the outer semicircular coupling disk (213) is
20 rotated counterclockwise 180 degrees so a person can remove the key from the
21 lock core (61).

22 Consequently, assembling the apparatus in accordance with the present
23 invention is more convenient than assembling a conventional one. The lock
24 coupler (21) will be held by the inner disk (13). The latch bolt coupler (20) is

1 held in position because the restitution element (30) provides a restitution force
2 on the inner semicircular disk (202) to hold the entire latch bolt coupler (20) in
3 place. The cover (40) holds the lock coupler (21), the latch bolt coupler (20), the
4 restitution element (30) and the inner disk (13) in the lock core chamber (11) so
5 that the entire transmission apparatus will be firmly held in the lock core
6 chamber (11). The lock core (61) and other elements of the supplemental lock
7 will be convenient to assemble.

8 Even though numerous characteristics and advantages of the present
9 invention have been set forth in the foregoing description, together with details
10 of the structure and function of the invention, the disclosure is illustrative only,
11 and changes may be made in detail, especially in matters of shape, size, and
12 arrangement of parts within the scope of the appended claims.